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Finite element modeling of eigenvibrations of a bar with an elastically attached load

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Abstract

© 2018 Author(s). The nonlinear second-order differential eigenvalue problem describing eigenvibrations of a bar with elastically attached load is investigated. The existence of an increasing sequence of positive simple eigenvalues with a limit point at infinity is established. To the sequence of eigenvalues, there corresponds a system of normalized eigenfunctions. The initial nonlinear differential eigenvalue problem is approximated by the finite element method on a uniform grid. The accuracy of approximate solutions is studied. The investigations in the present paper can be extended to the cases of more complicated and important problems on eigenvibrations of beams, plates, and shells with elastically attached loads.

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